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DANIEL E. JOHNSON
IBM CORPORATION, ALMADEN RESEARCH CENTER
INTELLECTUAL PROPERTY LAW DEPT. C4TA/J2B
650 HARRY ROAD
SAN JOSE, CA 95120-6099

EXAMINER	
RODRIGUEZ, GLENDA P	
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8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/026,029	Applicant(s) RETTNER ET AL.	
	Examiner Glenda P. Rodriguez	Art Unit 2651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 5/7/04

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25,27-29 and 31-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25,27-29 and 31-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims (1, 31 and 33) considered allowable subject matter in previous office action are now rejected in view of newly found prior art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-11, ~~14, 15~~, 13-15, 17-19, 22 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bell (US Patent No. 5, 199, 090) in view of Hopkins et al. (US Patent No. 5, 625, 617).

Regarding Claim 1, Bell teach an apparatus for facilitating the recording of data, comprising:

> An optical source (Pat. No. 5, 199, 090; Col. 4, L. 1-4);
>
> A metallic structure that receives optical radiation from the optical source and emits optical output from an emission region in said structure, said structure having an array of features that couple the radiation to at least one surface plasmon mode of said structure to increase the emitted optical output from said emission region beyond what the emitted optical output from said emission region would be in the absence of said features (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

And at least one element secured to said metallic structure, said at least one element generating magnetic fields for writing data in a data recording medium located within the near-field portion (Pat. No. 5, 199, 090; Abstract).

However, Bell does not explicitly disclose wherein the emitted optical output includes a near-field portion that extends from said emission region out to a distance less than the average wavelength of the emitted optical output. Hopkins et al. does disclose the use of a near-field portion wherein the distance from the emission region to the emitted optical output is less than a emission wavelength (Pat. No. 5, 625, 617; Abstract and Col. 2, L. 51-55 and Col. 3, L. 24-37. Hopkins et al. teach a near-field portion that its distance is controlled according to a determined wavelength (i.e. "average" wavelength as described by the Applicant in the Specification portion of the Application).). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Bell's invention with the teaching of Hopkins et al. in order to provide a higher photon flux to a data storage and retrieval device.

Claim 31 has limitations similar to those treated in the above rejection, and is met by the references as discussed above. Claim 31 however also recite the following limitations..." platform is configured to be moved relative to a data recording medium while the separation between said emission region and a surface of the data recording medium is kept to less than said average wavelength (Pat. No. 5, 625, 617; Fig. 10 and Col. 9, L. 13-46)."

Regarding Claim 2, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach further comprising a platform to

which said structure and said at least one element are secured, wherein said platform is configured to be moved relative to a data recording medium while the separation between said emission region and a surface of the data recording medium is kept to less than said average wavelength (Pat. No. 5, 625, 617; Fig. 10, Abstract Col. 2, L. 51-55, Col. 3, L. 24-37 and Col. 9, L. 13-46).

Regarding Claim 3, the combination of Bell and Hopkins et al. teach all the limitations of Claim 2. The combination further teaches wherein the separation is no longer than the near field distance (Pat. No. 5, 625, 917; Abstract).

Regarding Claim 4, the combination of Bell and Hopkins et al. teach all the limitations of Claim 2. The combination further teach wherein the slider having an air bearing surface (Pat. No. 5, 199, 090; Col. 2, L. 60-63).

Regarding Claim 5, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teaches an optical source comprising a laser (Pat. No. 5, 199, 090; Col. 4, L. 11-15).

Regarding Claim 6, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach an emission region being located at an output face of the laser (Pat. No. 5, 199, 090; Fig. 4 and Col. 7, L. 54 – Col. 8, L. 17).

Regarding Claim 7, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach an optical source comprising an optical waveguide (Pat. No. 5, 199, 090; Col. 2, L. 63-65).

Regarding Claim 8, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach a metallic structure includes metal selected from Al (Pat. No. 5, 199, 090; Col. 3, L. 39-45).

Regarding Claim 9 and 13, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach a metallic structure is joined by a dielectric layer (Pat. No. 5, 199, 090; Col. 16, L. 8-10).

Regarding Claim 10, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach wherein the spacing between said features in said metal structure is chosen to enhance the optical output from said emission region from at least one predetermined wavelength (Pat. No. 5, 625, 617; Abstract).

Regarding Claim 11, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach wherein said array includes recessed areas within said metal structure (Pat. No. 5, 625, 617; Abstract and Col. 3, L. 46-53).

Regarding Claim 14, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach wherein said emission region includes an aperture (Pat. No. 5, 625, 617; Col. 1, L. 14-21).

Regarding Claim 15, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach wherein said aperture is a slit (Pat. No. 5, 625, 617; Col. 1, L. 62-Col. 2, L. 18).

Regarding Claim 17, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach wherein said emission region includes a protrusion member (Pat. No. 5, 625, 617; Col. 11, L. 1-10).

Regarding Claim 18, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach said at least one element comprising at least one poling piece for applying a magnetic field in a portion of a storage medium as the emitted optical output from said emission region heats the portion (Pat. No. 5, 199, 090; Col. 4, L. 38-65).

Regarding Claim 19, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach wherein the thickness of the structure is between 50-500 nm (Pat. No. 5, 625, 617; Col. 1, L. 22-34).

Regarding Claim 22, the combination of Bell and Hopkins et al. teach all the limitations of Claim 1. The combination further teach two features (Pat. No. 5, 199, 090; Col. 4, L. 11-37).

3. Claims 23, 24, 25, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bell (US Patent No. 5, 199, 090) in view of Takagi et al. (US Patent No. 6, 351, 447).

Regarding Claims 23 and 29, Bell teaches a method of directing electromagnetic radiation onto a data recording medium, comprising:

Providing a metal structure having an array of features (Pat. 5, 199, 090; See Fig. 4, which Bell teaches a metallic structure);

Directing optical radiation onto the array of features to generate at least one surface plasmon mode, thereby enhancing the optical output emanating from an emission region in the metal structure, wherein the spacing between the features is chosen to enhance, at a predetermined wavelength, the optical output emanating from the emission region (Pat.

No. 5, 199, 090; Col. 8, L. 9-17 and Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

However, Bell does not explicitly disclose wherein directing the optical output from the emission region is read back by a processor. Takagi et al. disclose the use of wherein it teach the read back signal of the output being processed by a host processor (Pat. No. 6, 351, 447; Col. 6, Lines 52-62). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify Bell's invention with the teaching of Takagi et al. in order to determine the target sectors for reading and/or writing.

Regarding Claim 24, Bell teaches all the limitations of Claim 23. Bell further teaches wherein applying a magnetic field to the recording medium to write data into the recording medium (Pat. No. 5, 199, 090; Col. 4, Lines 38-65).

Regarding Claim 25, Bell teaches the limitations of Claim 24. Bell further teaches heating the recording medium with the optical output (Pat. No. 5, 199, 090; Col. 3, Lines 9-37).

Regarding Claim 28, Bell teaches the limitations of Claim 23. Bell further teaches wherein the recording medium selected from the group consisting of magneto-optic (Pat. No. 5, 199, 090; Col. 3, Lines 9-37).

4. Claim ~~32, 34, 35-37~~ 32-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bell (US Patent No. 5, 199, 090) in view of Kanbe et al. (US Patent No. 6, 623, 874).

Regarding Claims 32, Bell teaches a method of directing optical radiation onto a recording medium, comprising:

Providing a metal structure having an emission region and an array of features that enhance optical transmission through the emission region (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

Directing optical radiation onto the array of features (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

Directing the optical output from the emission region onto a recording medium to facilitate the recording of data (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

However, Bell does not explicitly disclose reading data with a processor and a grain size between 10 and 250 cubic nanometers. Kanbe et al. teach reading data with a processor (Pat. No. 6, 623, 874; Col. 5, L. 6-32) and a grain size of 98.91 nm^3 (it is known by an artisan of ordinary skill in the art that the average grain size is less than 5 nm (for example 3 nm in diameter) and the magnetic layer film thickness is 14 nm, resulting in the grain size having a 98.91 cubic nanometer measurement grain size. See Pat. No. 6, 623, 874; Col. 9, L. 28-44 and Col. 10, L. 10-12). It is obvious to a person of ordinary skill in the art, at the tie the invention was made, to modify Bell's invention with the teaching of Kanbe et al. with a processor in order to implement a highly reliable magnetic recording medium.

Regarding Claim 33, Bell teaches a method of writing data, comprising:

Directing optical radiation onto a magnetic medium to heat a portion of the medium (Pat. No. 5, 199, 090; Col. 8, L. 9-17 and Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

Applying a magnetic field to the recording medium to write data into the recording medium (Pat. No. 5, 199, 090; Col. 4, L. 38-65).

However, Bell does not explicitly disclose a grain size between 10 and 250 cubic nanometers. Kanbe et al. teach a grain size of 98.91 nm^3 (It is known by an artisan of ordinary skill in the art that the average grain size is less than 5 nm (for example 3 nm in diameter) and the magnetic layer film thickness is 14 nm, resulting in the grain size having a 98.91 cubic nanometer measurement grain size, which falls between the specified range from 10 to 500 cubic nm according to the Applicant's Specification. See Pat. No. 6, 623, 874; Col. 9, L. 28-44 and Col. 10, L. 10-12). It is obvious to a person of ordinary skill in the art, at the tie the invention was made, to modify Bell's invention with the teaching of Kanbe et al. in order to implement a highly reliable magnetic recording medium.

Regarding Claim 34, Bell teaches a method of directing electromagnetic radiation onto a data recording medium, comprising:

Providing a metal structure having an array of features (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23);

Directing optical radiation onto the array of features to generate at least one surface plasmon mode, thereby enhancing the optical output emanating from an emission region in the metal structure (Pat. No. 5, 199, 090; Col. 8, Line 65 to Col. 9, Line 8 and Col. 16, Line 2 to Col. 17, Line 23); and

Directing the optical output from the emission region onto a recording medium to facilitate the recording of data (Pat. No. 5, 199, 090; Col. 4, L. 38-65).

However, Bell does not explicitly disclose a grain size between 10 and 250 cubic nanometers. Kanbe et al. teach a grain size of 98.91 nm^3 (It is known by an artisan of ordinary skill in the art that the average grain size is less than 5 nm (for example 3 nm in diameter) and the magnetic layer film thickness is 14 nm, resulting in the grain size having a 98.91 cubic nanometer measurement grain size, which falls between the specified range from 10 to 250 cubic nm according to the Applicant's Specification. See Pat. No. 6, 623, 874; Col. 9, L. 28-44 and Col. 10, L. 10-12). It is obvious to a person of ordinary skill in the art, at the tie the invention was made, to modify Bell's invention with the teaching of Kanbe et al. in order to implement a highly reliable magnetic recording medium.

Regarding Claim 35, the combination of Bell and Kanbe et al. teach all the limitations of Claim 34. The combination further teaches wherein applying a magnetic field to the recording medium to write data into the recording medium (Pat. No. 5, 199, 090; Col. 4, Lines 38-65).

Regarding Claim 36, the combination of Bell and Kanbe et al. teach all the limitations of Claim 35. The combination further teaches heating the recording medium with the optical output (Pat. No. 5, 199, 090; Col. 3, Lines 9-37).

Regarding Claim 37, the combination of Bell and Kanbe et al. teach all the limitations of Claim 34. The combination further teach a magneto optic head for a magneto optic medium (Pat. No. 5, 199, 090; Abstract).

5. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bell and Takagi et al. as applied to claim 25 above, and further in view of Kanbe et al. (US Patent No. 6, 623, 874). The combination of Bell and Takagi et al. teach all the limitations of Claim 25. However, the combination does not explicitly disclose a grain size in the order between 10 and 250 cubic nanometers. Kanbe et al. teach a grain size of 98.91 nm^3 (It is known by an artisan of ordinary skill in the art that the average grain size is less than 5 nm (for example 3 nm in diameter) and the magnetic layer film thickness is 14 nm, resulting in the grain size having a 98.91 cubic nanometer measurement grain size, which falls between the specified range from 10 to 250 cubic nm according to the Applicant's Specification. See Pat. No. 6, 623, 874; Col. 9, L. 28-44 and Col. 10, L. 10-12). It is obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the combination of Bell and Takagi et al.'s invention with the teaching of Kanbe et al. in order to implement a highly reliable magnetic recording medium.

6. Claim16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bell and Hopkins et al. as applied to claim 14 above, and further in view of Kino (US Patent No. 5, 689, 480). The combination of Bell and Hopkins et al. teach all the limitations of Claim 14. However, the combination does not explicitly disclose wherein the aperture has a width of 10-100 nanometer. Kino teach the use of an aperture of 50 nm (Pat. No. 5, 689, 480; Col. 3, L. 50-55). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the combination of Bell and Hopkins et al.'s invention with the teaching of Kino in order to has an aperture of 10-100 nm in order to not suffer much loss in the wavelength.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination Bell and Hopkins et al. as applied to claim 1 above, and further in view of Ahuja et al. (US Patent No. 6, 408, 118). The combination of Bell and Hopkins et al. teach all the limitations of Claim 14. However, the combination does not explicitly disclose wherein the optical radiation from said source has a full width half maximum (FWHM) of less than about 0.1 times the average wavelength of the optical radiation. Ahuja et al. teach an optical radiation device with a FWHM of 0.1 times a wavelength (Pat. No. 6, 408, 118; Col. 5, L. 11-19). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the combination of Bell and Hopkins et al. with the teaching of Ahuja et al. in order to acquires a pseudorandom distribution in the grain size in the medium.

8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bell and Hopkins et al. as applied to claim 1 above, and further in view of Chandonnet et al. (US Patent No. 5, 729, 641). The combination of Bell and Hopkins et al. teach all the limitations of Claim 14. However, the combination does not explicitly disclose wherein the optical radiation has a wavelength that matches a resonant frequency of said structure. Chandonnet et al. teach an optical radiation has a wavelength that matches a resonant frequency of said structure (Pat. No. 5, 729, 641; Col. 6, L. 57 – Col. 7, L. 20). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the combination of Bell and Hopkins et al. with the teaching of Chandonnet et al. in order to propagating radiation will be absorbed by the surface plasmon.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bell and Hopkins et al. as applied to claim 1 above, and further in view of Berini (US Patent No. 6, 614, 960). The combination of Bell and Hopkins et al. teach all the limitations of Claim 14. However, the combination does not explicitly disclose wherein the spacing between said features in said metal structure is periodic. Berini teaches an optical device wherein the spacing between said features in said metal structure is periodic (Pat. No. 6, 614, 960; Col. 34, L. 39-45). It would have been obvious to a person of ordinary skill in the art, at the time the invention was made, to modify the combination of Bell and Hopkins et al. with the teaching of Berini in order to to implement a prescribed transfer function.

Response to Arguments

10. Applicant's arguments with respect to claims 23-29 and 32 have been considered but are moot in view of the new ground(s) of rejection due to the newly amended claims.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Glenda P. Rodriguez whose telephone number is (703) 305-8411. The examiner can normally be reached on Monday thru Thursday: 7:00-5:00; alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (703) 305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SINH TRAN
PRIMARY EXAMINER

gpr
August 18, 2004.